

WHAT IS CLAIMED IS:

1. An information reproducing apparatus comprising:
first means for reading a first signal from a first track of a
5 recording medium;
second means for reading a second signal from a second track
of the recording medium, the second track neighboring the first
track;
a filter for filtering the second signal read by the second
10 means into a filtering-resultant signal according to a controllable
filtering characteristic;
a first subtracter for subtracting the filtering-resultant signal
from the first signal read by the first means to generate a
subtraction-resultant signal;
15 a peak detector for detecting whether or not a level
represented by the first signal read by the first means peaks, and
generating peak-point information representing a timing at which
the level represented by the first signal peaks;
a second subtracter for generating an error signal indicative of
20 a difference between the subtraction-resultant signal and a
prescribed reference signal at a timing equal to the timing
represented by the peak-point information; and
third means for controlling the filtering characteristic of the
filter in response to the error signal generated by the second
25 subtracter so as to minimize the error signal.

2. An information reproducing apparatus comprising:

first means for reading a first signal of a run-length-limited code from a first track of a recording medium;

second means for reading a second signal from a second track
5 of the recording medium, the second track neighboring the first track;

a transversal filter subjecting the first signal read by the first means to a partial-response waveform equalization to generate an equalization-resultant signal, the partial-response waveform
10 equalization depending on tap coefficients;

a controllable filter for filtering the second signal read by the second means into a filtering-resultant signal according to a controllable filtering characteristic;

a first subtracter for subtracting the filtering-resultant signal
15 from the equalization-resultant signal to generate a subtraction-resultant signal;

third means for detecting whether or not one of (1) the first signal read by the first means and (2) the subtraction-resultant signal generated by the first subtracter corresponds to a peak point,
20 and generating peak-point information in response to a result of said detecting;

a temporary decision device for calculating a temporary decision value of the subtraction-resultant signal on the basis of a PR mode signal, an RLL mode signal, the peak-point information, and
25 an actual value of the subtraction-resultant signal, the PR mode signal representing a type of the partial-response waveform

equalization, the RLL mode signal representing a type of the run-length-limited code;

5 a second subtracter for calculating a difference between the temporary decision value of the subtraction-resultant signal and the actual value thereof, and generating an error signal in response to the calculated difference; and

10 fourth means for controlling the tap coefficients of the transversal filter and the filtering characteristic of the controllable filter in response to the error signal generated by the second subtracter so as to minimize the error signal.

3. An information reproducing apparatus comprising:

first means for reading a first signal of a run-length-limited code from a first track of a recording medium;

15 second means for reading a second signal from a second track of the recording medium, the second track neighboring the first track;

a first A/D converter for converting the first signal read by the first means into a first digital signal;

20 a second A/D converter for converting the second signal read by the second means into a second digital signal;

third means for re-sampling the first digital signal generated by the first A/D converter to generate a first re-sampling-resultant signal;

25 fourth means for generating a bit clock signal from the first digital signal generated by the first A/D converter;

a first transversal filter subjecting the first re-sampling-resultant signal to a partial-response waveform equalization to generate an equalization-resultant signal, the partial-response waveform equalization depending on first tap coefficients;

- 5 fifth means for re-sampling the second digital signal generated by the second A/D converter in response to the bit clock signal to generate a second re-sampling-resultant signal;

- 10 a second transversal filter for filtering the second re-sampling-resultant signal into a pseudo crosstalk signal according to second tap coefficients, the pseudo crosstalk signal indicating a crosstalk between the first and second tracks;

a first subtracter for subtracting the pseudo crosstalk signal from the equalization-resultant signal to generate a subtraction-resultant signal;

- 15 sixth means for detecting whether or not one of (1) the first digital signal generated by the first A/D converter and (2) the subtraction-resultant signal generated by the first subtracter corresponds to a peak point, and generating peak-point information in response to a result of said detecting;

- 20 a delay circuit responsive to the peak-point information generated by the fifth means for outputting at least three successive samples of the peak-point information;

- 25 a temporary decision device for calculating a temporary decision value of the subtraction-resultant signal on the basis of a PR mode signal, an RLL mode signal, the successive samples of the peak-point information which are outputted from the delay circuit,

and an actual value of the subtraction-resultant signal, the PR mode signal representing a type of the partial-response waveform equalization, the RLL mode signal representing a type of the run-length-limited code;

- 5 a second subtracter for calculating a difference between the temporary decision value of the subtraction-resultant signal and the actual value thereof, and generating an error signal in response to the calculated difference;

- 10 seventh means for controlling the first tap coefficients of the first transversal filter in response to the error signal generated by the second subtracter so as to minimize the error signal; and

- eighth means for controlling the second tap coefficients of the second transversal filter in response to the error signal generated by the second subtracter.

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4. An information reproducing apparatus as recited in claim 3, wherein at least one of the PR mode signal and the RLL mode signal remains fixed.

- 20 5. An information reproducing apparatus as recited in claim 3, wherein the sixth means comprises means for detecting whether or not the subtraction-resultant signal generated by the first subtracter corresponds to a peak point, and generating peak-point information in response to a result of said detecting.

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6. An information reproducing apparatus as recited in claim 2,

further comprising a phase-locked loop circuit for generating a system clock signal from the subtraction-resultant signal generated by the first subtracter, a delay circuit responsive to the peak-point information generated by the third means for outputting at least
5 three successive samples of the peak-point information, and means provided in the temporary decision device for calculating the temporary decision value of the subtraction-resultant signal on the basis of the PR mode signal, the RLL mode signal, the successive samples of the peak-point information which are outputted from the
10 delay circuit, and the actual value of the subtraction-resultant signal, wherein the third means is contained in the phase-locked loop circuit.

7. An information reproducing apparatus as recited in claim 2,
15 further comprising a phase-locked loop circuit for generating a system clock signal from the first signal read by the first means, a delay circuit responsive to the peak-point information generated by the third means for outputting at least three successive samples of the peak-point information, and means provided in the temporary
20 decision device for calculating the temporary decision value of the subtraction-resultant signal on the basis of the PR mode signal, the RLL mode signal, the successive samples of the peak-point information which are outputted from the delay circuit, and the actual value of the subtraction-resultant signal.

25 8. An information reproducing apparatus as recited in claim 3,

wherein the type of the partial-response waveform equalization which is represented by the PR mode signal is expressed as PR (a, b, -b, -a), and the successive samples of the peak-point information are three successive samples, and wherein the temporary decision

5 device comprises means for calculating a value P on the basis of the successive samples of the peak-point information, the value P being equal to $a \cdot G$ when at least one of the successive samples of the peak-point information except a central sample corresponds to a peak point, the value P being equal to $(a+b) \cdot G$ when the central

10 sample among the successive samples of the peak-point information corresponds to a peak point, means for detecting a polarity of a level represented by the equalization-resultant signal which occurs when the central sample among the successive samples of the peak-point information corresponds to a peak point, means for calculating the

15 temporary decision value on the basis of the calculated value P and the detected polarity, and means for setting the temporary decision value to "0" when none of the successive samples of the peak-point information corresponds to a peak point, where G denotes a gain factor.

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9. An information reproducing apparatus as recited in claim 3, wherein the type of the partial-response waveform equalization which is represented by the PR mode signal is expressed as PR (a, b, -b, -a), and the successive samples of the peak-point information

25 are five successive samples, and wherein the temporary decision device comprises means for calculating a value P on the basis of the

successive samples of the peak-point information, the value P being equal to $a \bullet G$ when at least one of second and fourth samples among the successive samples of the peak-point information corresponds to a peak point, the value P being equal to $(a+b) \bullet G$ when the central sample among the successive samples of the peak-point information corresponds to a peak point, means for detecting a polarity of a level represented by the equalization-resultant signal which occurs when the central sample among the successive samples of the peak-point information corresponds to a peak point, means for calculating the temporary decision value on the basis of the calculated value P and the detected polarity, and means for setting the temporary decision value to "0" when none of second, third, and fourth samples among the successive samples of the peak-point information corresponds to a peak point, where G denotes a gain factor.

10. An information reproducing apparatus as recited in claim 1, wherein the first means comprises means for reading the first signal from the first track of the recording medium in a tangential push-pull method.

11. An information reproducing apparatus comprising:
first means for reading a first signal from a first track of a recording medium;

second means for reading a second signal from a second track of the recording medium, the second track neighboring the first track;

a filter for filtering the second signal read by the second means into a filtering-resultant signal according to a controllable filtering characteristic;

a first subtracter for subtracting the filtering-resultant signal
5 from the first signal read by the first means to generate a subtraction-resultant signal;

a zero-cross detector for detecting whether or not a level represented by the first signal read by the first means crosses zero, and generating 0-point information representing a timing at which
10 the level represented by the first signal crosses zero;

a peak detector for detecting whether or not the level represented by the first signal read by the first means peaks, and generating peak-point information representing a timing at which the level represented by the first signal peaks;

15 third means for selecting one of (1) the 0-point information generated by the zero-cross detector and (2) the peak-point information generated by the peak detector;

a second subtracter for generating an error signal indicative of a difference between the subtraction-resultant signal and a
20 prescribed reference result signal at a timing equal to the timing represented by the information selected by the third means; and

fourth means for controlling the filtering characteristic of the filter in response to the error signal generated by the second subtracter so as to minimize the error signal.

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12. An information reproducing apparatus comprising:

first means for reading a first signal of a run-length-limited code from a first track of a recording medium;

second means for reading a second signal from a second track of the recording medium, the second track neighboring the first

5 track;

a transversal filter subjecting the first signal read by the first means to a partial-response waveform equalization to generate an equalization-resultant signal, the partial-response waveform equalization depending on tap coefficients;

10 a controllable filter for filtering the second signal read by the second means into a filtering-resultant signal according to a controllable filtering characteristic;

a first subtracter for subtracting the filtering-resultant signal from the equalization-resultant signal to generate a subtraction-

15 resultant signal;

third means for detecting whether or not one of (1) the first signal read by the first means and (2) the subtraction-resultant signal generated by the first subtracter corresponds to a zero-cross point, and generating 0-point information in response to a result of

20 said detecting;

fourth means for detecting whether or not one of (1) the first signal read by the first means and (2) the subtraction-resultant signal generated by the first subtracter corresponds to a peak point, and generating peak-point information in response to a result of

25 said detecting;

fifth means for selecting one of (1) the 0-point information

generated by the third means and (2) the peak-point information generated by the fourth means;

5 a temporary decision device for calculating a temporary decision value of the subtraction-resultant signal on the basis of a PR mode signal, an RLL mode signal, the information selected by the fifth means, and an actual value of the subtraction-resultant signal, the PR mode signal representing a type of the partial-response waveform equalization, the RLL mode signal representing a type of the run-length-limited code;

10 a second subtracter for calculating a difference between the temporary decision value of the subtraction-resultant signal and the actual value thereof, and generating an error signal in response to the calculated difference; and

15 sixth means for controlling the tap coefficients of the transversal filter and the filtering characteristic of the controllable filter in response to the error signal generated by the second subtracter so as to minimize the error signal.

13. An information reproducing apparatus comprising:

20 first means for reading a first signal of a run-length-limited code from a first track of a recording medium;

second means for reading a second signal from a second track of the recording medium, the second track neighboring the first track;

25 a first A/D converter for converting the first signal read by the first means into a first digital signal;

a second A/D converter for converting the second signal read by the second means into a second digital signal;

third means for re-sampling the first digital signal generated by the first A/D converter to generate a first re-sampling-resultant signal;

fourth means for generating a bit clock signal from the first digital signal generated by the first A/D converter;

a first transversal filter subjecting the first re-sampling-resultant signal to a partial-response waveform equalization to generate an equalization-resultant signal, the partial-response waveform equalization depending on first tap coefficients;

fifth means for re-sampling the second digital signal generated by the second A/D converter in response to the bit clock signal to generate a second re-sampling-resultant signal;

a second transversal filter for filtering the second re-sampling-resultant signal into a pseudo crosstalk signal according to second tap coefficients, the pseudo crosstalk signal indicating a crosstalk between the first and second tracks;

a first subtracter for subtracting the pseudo crosstalk signal from the equalization-resultant signal to generate a subtraction-resultant signal;

sixth means for detecting whether or not one of (1) the first digital signal generated by the first A/D converter and (2) the subtraction-resultant signal generated by the first subtracter corresponds to a zero-cross point, and generating 0-point information in response to a result of said detecting;

seventh means for detecting whether or not one of (1) the first digital signal generated by the first A/D converter and (2) the subtraction-resultant signal generated by the first subtracter corresponds to a peak point, and generating peak-point information
5 in response to a result of said detecting;

eighth means for selecting one of (1) the 0-point information generated by the sixth means and the peak-point information generated by the seventh means;

a delay circuit responsive to the information selected by the
10 eighth means for outputting at least three successive samples of the information selected by the eighth means;

a temporary decision device for calculating a temporary decision value of the subtraction-resultant signal on the basis of a PR mode signal, an RLL mode signal, the successive samples of the
15 information which are outputted from the delay circuit, and an actual value of the subtraction-resultant signal, the PR mode signal representing a type of the partial-response waveform equalization, the RLL mode signal representing a type of the run-length-limited code;

20 a second subtracter for calculating a difference between the temporary decision value of the subtraction-resultant signal and the actual value thereof, and generating an error signal in response to the calculated difference;

ninth means for controlling the first tap coefficients of the
25 first transversal filter in response to the error signal generated by the second subtracter so as to minimize the error signal; and

tenth means for controlling the second tap coefficients of the second transversal filter in response to the error signal generated by the second subtracter.

5 14. An information reproducing apparatus as recited in claim 13, wherein at least one of the PR mode signal and the RLL mode signal remains fixed.

10 15. An information reproducing apparatus as recited in claim 13, wherein the sixth means comprises means for detecting whether or not the subtraction-resultant signal generated by the first subtracter corresponds to a zero-cross point, and generating 0-point information in response to a result of said detecting, and the seventh means comprises means for detecting whether or not the
15 subtraction-resultant signal generated by the first subtracter corresponds to a peak point, and generating peak-point information in response to a result of said detecting.

16. An information reproducing apparatus as recited in claim 12,
20 further comprising a phase-locked loop circuit for generating a system clock signal from the subtraction-resultant signal generated by the first subtracter, a delay circuit responsive to the information selected by the fifth means for outputting at least three successive samples of the information selected by the fifth means, and means
25 provided in the temporary decision device for calculating the temporary decision value of the subtraction-resultant signal on the

basis of the PR mode signal, the RLL mode signal, the successive samples of the information which are outputted from the delay circuit, and the actual value of the subtraction-resultant signal, wherein the third means and the fourth means are contained in the
5 phase-locked loop circuit.

17. An information reproducing apparatus as recited in claim 12, further comprising a phase-locked loop circuit for generating a system clock signal from the first signal read by the first means, a
10 delay circuit responsive to the information selected by the fifth means for outputting at least three successive samples of the information selected by the fifth means, and means provided in the temporary decision device for calculating the temporary decision value of the subtraction-resultant signal on the basis of the PR mode
15 signal, the RLL mode signal, the successive samples of the information which are outputted from the delay circuit, and the actual value of the subtraction-resultant signal.

18. An information reproducing apparatus as recited in claim 12,
20 further comprising seventh means for changing the partial-response waveform equalization by the transversal filter between PR (a, b, b, a) equalization and PR (a, b, -b, -a) equalization.

19. An information reproducing apparatus as recited in claim 11,
25 wherein the first means comprises means for reading the first signal from the first track of the recording medium in a tangential

push-pull method.

20. An information reproducing apparatus comprising:

- first means for reading a first signal from a first track of a
5 recording medium;
second means for reading a second signal from a second track
of the recording medium, the second track neighboring the first
track;
a filter for filtering the second signal read by the second
10 means into a filtering-resultant signal according to a controllable
filtering characteristic;
a first subtracter for subtracting the filtering-resultant signal
from the first signal read by the first means to generate a
subtraction-resultant signal;
15 a peak detector for detecting whether or not a level
represented by the first signal read by the first means peaks, and
generating peak-point information representing a timing at which
the level represented by the first signal peaks;
a temporary decision circuit for implementing a temporary
20 decision about the subtraction-resultant signal generated by the first
subtracter, and generating a temporary decision result signal
representing a result of the temporary decision;
a second subtracter for generating an error signal indicative of
a difference between the subtraction-resultant signal and the
25 temporary decision result signal at a timing equal to the timing
represented by the peak-point information; and

third means for controlling the filtering characteristic of the filter in response to the error signal generated by the second subtracter so as to minimize the error signal.

5 21. An information reproducing apparatus comprising:

first means for reading a first signal from a first track of a recording medium;

second means for reading a second signal from a second track
of the recording medium, the second track neighboring the first
10 track;

a filter for filtering the second signal read by the second means into a filtering-resultant signal according to a controllable filtering characteristic;

a first subtracter for subtracting the filtering-resultant signal
15 from the first signal read by the first means to generate a subtraction-resultant signal;

a zero-cross detector for detecting whether or not a level represented by the first signal read by the first means crosses zero, and generating 0-point information representing a timing at which
20 the level represented by the first signal crosses zero;

a peak detector for detecting whether or not the level represented by the first signal read by the first means peaks, and generating peak-point information representing a timing at which the level represented by the first signal peaks;

25 third means for selecting one of (1) the 0-point information generated by the zero-cross detector and (2) the peak-point

information generated by the peak detector;

a temporary decision circuit for implementing a temporary decision about the subtraction-resultant signal generated by the first subtracter, and generating a temporary decision result signal

5 representing a result of the temporary decision;

a second subtracter for generating an error signal indicative of a difference between the subtraction-resultant signal and the temporary decision result signal at a timing equal to the timing represented by the information selected by the third means; and

10 fourth means for controlling the filtering characteristic of the filter in response to the error signal generated by the second subtracter so as to minimize the error signal.